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EXHIBIT A

Closed

PATENT PROPOSAL 02-CA-398

*** CONFIDENTIAL ***

Joe ✓

Descriptive Title of Invention:

MEMS -based PC pointing device (for disables)

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UFFICIO BREVETTI AGRATE
26 SET [illegible]

!!1. *Date of conception of invention*

2. *Date of reduction to practice of invention* [redacted]

Describe how, where and to what extent the invention was reduced to practice.

Demo-board and software implemented.
System refinement on-going.

3 *Was any of the work performed under a contract with third party?* _No

What party? **Attach copy of contract**

4. *Has there been:*

1) any disclosure of the invention outside of the company? _No_ *when?*

Give details

2) any sampling or sale of products embodying the invention? _No_ *when?*

Give details

5. *When do you expect any such disclosure or sampling or sale?* [redacted]

Give details

6. *Is the invention related to any other invention / Patent Application?*

which one(s)?

7. ***Prior Art:*** *Description of the technological background and of the state of the art, including references to products, patents, articles, etc. known to you (both from your company and others), useful for understanding the invention and for determining its scope.*

8. ***Description of Invention:*** *Brief explanation of what the invention is, how it differs from Prior Art, and what advantages and disadvantages it has with respect to the Prior Art, and detailed and complete explanation of the invention (both structural and functional) making reference to drawings.*

See attached document.

9. ***Signatures of inventors with Date of signature:***

_F.Pasolini *Date: _25-Sept-2002*

_P.Bendiscioli *Date: _25-Sept-2002*

Enclosures:
- ☐ *Attached hereto are ( ) Prior Art documents [see item 7 above]*
- ☒ *Attached hereto are ( ) pages of Description of the Invention [see item 8 above]*
- ☐ *Attached hereto are ( ) pages of examplifying drawings / sketches*
- ☒ *Attached hereto is a product classification page !!!*

1 - Category of the invention

Indicate one letter in the following list that better fits to the invention

☐	**D** - Device	Silicon structure or part of it and its way of working
☐	**C** - Circuit	Electric circuit, even if some of its parts are represented by blocks, and its working
☒	**S** - System	Everything above circuit level, like architectures and methodologies; usually described with a block diagram
☐	**F** - Frontend	Steps, methodology and manufacturing machines or tools to get to the product before its testing; typically silicon processes
☐	**B** - Backend	Testing, Packaging, Bonding, Assembly and everything after testing

2 - Product Codes: ______________________________

Indicate the real-product codes in which the invention is or will be used - e.g. TDA123, U012, ...

3 - Product Classes

Indicate one or more words that better describe the products the invention applies to

☐	**A/D**	Analog to digital converters
☐	**AGC**	Automatic Gain Control systems
☐	**AMPLIFIER**	Amplifiers architectures and circuits
☐	**ANALOG**	Products for analogic applications; always used in combination with another word (for example CMOS ANALOG)
☐	**AUDIO**	Every device, circuit or system Audio- or Radio- dedicated
☐	**AUTO**	All the products for automotive applications (Ignition, Injection and Instrumentation)
☐	**BATTERY**	Battery chargers and accessories
☐	**BCD**	BCD technology
☐	**B/E**	Everything in backend that is not Packaging or Testing
☐	**BICMOS**	BICMOS technology
☐	**BIPOLAR**	Bipolar technology and devices
☐	**CCD**	CCD devices
☐	**CMOS**	CMOS devices, circuits and technology
☐	**COMPUTER**	Everything applies to Computers and is not included in GRAPHICS, PERIPHERAL and PROCESSORS which are defined below
☐	**D/A**	Digital to analog converters
☐	**DESIGN**	Products and methods to carry out design
☐	**DIODE**	Diode devices
☐	**DISPLAYS**	Circuits, devices and architectures for displays and monitors
☐	**DRAM**	DRAM memory cells and circuits
☐	**DRIVERS**	Circuits and systems to drive Hard-Disks and to interface with them
☐	**EPROM**	EPROM memory cells and circuits
☐	**EEPROM**	EEPROM memory cells and circuits
☐	**F/E**	Everything in frontend which cannot be classified with other words of this list, such as machine and tools used in silicon processes
☐	**FIFO**	FIFO memories
☐	**FILTER**	Analog and digital filters
☐	**FLASH**	FLASH memory cells and circuits
☐	**FUZZY**	Fuzzy logic processors, architectures and methods
☐	**GRAPHICS**	Graphic processors

☐	**HCMOS**	HCMOS technology and devices
☐	**HPD**	High Power Devices
☐	**IGBT**	IGBT devices and technology
☐	**ISDN**	ISDN protocols and relative circuits
☐	**LAMP**	Lamp driver devices and circuits (Light Ballast)
☐	**LOGIC**	All logic circuits (FLIP-FLOPs ...), families (TTL ...) and interfaces
☐	**MODEM**	Circuits and systems for modems
☐	**MOS**	MOS devices and technology
☐	**MOTORS**	Everything deals with electric motors, such as drivers or regulators
☐	**MPEG**	Everything deals with MPEG
☐	**NEURAL**	Neural networks and their applications
☐	**NVRAM**	NVRAM memories
☐	**PACKAGING**	Packages and their manufacturing methods
☐	**PASSIVE**	Passive devices (Resistors, Inductors, Capacitors)
☒	**PERIPHERAL**	Peripheral controllers and interfaces
☐	**PIC**	Power Integrated Circuits, such as integrated drivers and controllers of an output power stage
☐	**PLA**	Devices, circuits and systems for Programmable Linear Arrays
☐	**POWER BIPOLAR**	Power Bipolar transistors and technology
☐	**POWER MOS**	Power MOS technology and devices
☐	**POWER ON RESET**	Circuits or devices to initialize a system at switching on
☐	**POWER SUPPLY**	Circuits and systems for supplying power, such as e.g. generators
☐	**PROCESSORS**	Used together with Peripheral and Graphics to better specify Computer products classification
☐	**PROTECTION**	Protection circuits, devices and systems (against overvoltages, ovecurrents, ElectroStatic Discharge ...)
☐	**REGULATOR**	Voltage regulators, stabilizers, elevators and every circuit that fixes a defined voltage
☐	**ROM**	ROM memory cells and circuits
☒	**SENSORS**	Sensing devices and relative circuitry
☐	**SHADOW RAM**	SHADOW RAM memories
☐	**SLIC**	Telecom circuits and systems on the Central Office's side
☐	**SMART POWER**	Smart Power applications
☐	**SRAM**	SRAM memory cells and circuits
☐	**TESTING**	methods, circuits and apparatuses for testing
☐	**TELEPHONE SET**	Telecom circuits and systems on the Subscriber's side
☐	**TV**	All circuits and devices for TV sets
☐	**VIPOWER**	Products in VIPOWER technology or modifications to process steps
☐	**OTHERS**	____________________

... please indicate proposed newclasses ...

MEMS-based PC pointing device (for disables)

Inventori: Fabio Pasolini, Paolo Bendiscioli

La presente invenzione descrive la realizzazione di un puntatore (mouse like) particolarmente adatto per persone disabili che hanno una ridotta mobilita' residua (ad. es. sono in grado di muovere solo la testa).
Il puntatore utilizza un accelerometro MEMS a due assi funzionante come inclinometro. Tale accelerometro (inserito in un opportuno contenitore, preferibilmente plastico) va indossato dal paziente e fissato solidalmente con un arto mobile dello stesso.
Ad es. si ipotizza la possibilita' di inserire l'hardware che compone il puntatore in un contenitore simile a quello usato per gli apparecchi acustici, nella bacchetta degli occhiali del disabile o in una scatoletta che e' fissata al capo tramite un cerchietto per capelli.

Il segnale proveniente dall'accelerometro viene digitalizzato e acquisito da un micro-controllore che provvede ad inviare al PC le informazioni di 'spostamento' e click.
L'uscita dell'accelerometro (che sente l'accelerazione di gravita' i.e. movimento capo -> variazione dell'accelazione misurata dal sensore) e' impiegata sia per implementare le funzioni di spostamento del puntatore sullo schermo che di click.

In pratica, quando l'uscita X (rispettivamente Y) dell'accelerometro in modulo e' maggiore di una certa soglia * (programmabile dall'utente durante la fase di setup del pointing device) si ha uno spostamento della freccina del mouse nella direzione X (rispettivamente Y) (il segno del segnale definisce la direzione destra/sinistra avanti/indietro) con una velocita' che dipende dall'ampiezza del segnale acquisito.
Per il click: si misura la variazione di segnali X (risp. Y) rispetto ai cmapioni precedenti.
In pratica calcolando la variazione campione_attuale - cmapione_precende si calcola la derivata dei segnali lungo le direzioni X (risp. Y) e se questa e' maggiore di una data soglia si associa all'evento la pressione di un tasto del mouse. Anche in questo caso la derivata_minima/velocita'_di_spostamento_del_capo che fa scattare il click e' definibile dall'utente.

Dal punto di vista dell'utilizzatore, spostamenti lenti del capo in avanti/indietro destra/sinistra fanno spostare la freccina sullo schermo del computer (eventuali tremori del capo sono filtrati dalla soglia di intervento *), mentre spostamenti veloci del capo generano eventi di click.

Il sistema di puntamento (sensore + micro-controllore) puo' essere collegato al PC tramite l'utilizzo di un sottile cavetto (seriale/USB) o tramite un link radio-frequenza (onde-radio). In quest'ultimo caso sara' alimentato tramite una piccola batteria.

Il fatto di poter muovere "velocemente" il capo di 4 direzioni distinte permette di associare al puntare 4 differenti eventi di click. Questi ad esempio possono essere definiti nel modo seguente:
- movimento capo a destra: click destro
- movimento capo a sinistra: click sinistro
- movimento capo avanti: click sinistro con tasto che rimane premuto (navigazioni in internet, scrolling pagine, ...)

- movimento capo indietro: rilascio del click sinistro

Le funzioni/associazioni sopra citate sono solo indicative e possono essere rimappate via SW dall'utilizzatore stesso del sistema).